

CLAIMS

1. A spatial position detection method for detecting information on a relative spatial position of an object with respect to an interface section having an arbitrary shape and dealing with transmission of information and a signal from one side to the other side of the interface section, the spatial position detection method comprising:

detecting an electromagnetic wave radiated from the object and transmitted through the interface section; and

calculating information on spatial position coordinates of the object based on a result of the detecting.

2. A spatial position detection method according to claim 1, wherein the electromagnetic wave is detected by calculating a position of a focus spot resulting from focusing of the electromagnetic wave radiated from the object and transmitted through the interface section.

3. A spatial position detection method according to claim 1, wherein shape information of the interface section is stored as spatial coordinate data in advance, and relative spatial position information of the object with respect to the interface section is calculated based on the spatial position coordinates of the object and the stored

spatial coordinate data of the interface section.

4. A spatial position detection method according to claim 2, wherein a position in the focus spot having a highest signal intensity in an
5 intensity distribution of the focus spot is set as the position of the focus spot, an incident angle of the electromagnetic wave radiated from the object and entering the interface section is calculated based on the position of the focus spot and optical
10 characteristics exhibited during the focusing of the electromagnetic wave, and information on spatial position coordinates of the object is calculated based on intensity of the focus spot and the incident angle of the electromagnetic wave radiated from the
15 object.

5. A spatial position detection method according to claim 2, wherein positions of plural focus spots on predetermined surfaces caused by respectively focusing the electromagnetic wave
20 radiated from the object are calculated, positions in the focus spots having a highest signal intensity in an intensity distribution of the focus spots are each set as the positions of the focus spots, plural incident angles of the electromagnetic wave radiated
25 from the object and entering the interface section are calculated based on the positions of the plural focus spots and optical characteristics exhibited

during the focusing of the electromagnetic wave, and information on spatial position coordinates of the object is calculated based on the plural incident angles of the electromagnetic wave.

5 6. A spatial position detection method according to claim 1, wherein information on a physical property distribution of the interface section is stored in advance, an influence exerted by the interface section to propagation characteristics
10 of the electromagnetic wave in incident angle positions of the electromagnetic wave on the interface section is taken into a consideration, and correction is performed on the calculation of the information on the spatial position of the object.

15 7. A spatial position detection method according to claim 1, wherein the electromagnetic wave radiated from the object has a frequency bandwidth that is arbitrarily selected within a range from 30 GHz to 30 THz.

20 8. An information input method that employs the spatial position detection method according to claim 1, comprising:

 monitoring information on a relative distance between an arbitrary position of the interface
25 section and the object;

 processing a result of the monitoring in accordance with a predetermined interpretation

method; and

controlling an operation of an apparatus and input states of information or a signal.

9. A spatial position detection apparatus for
5 implementing the spatial position detection method according to claim 1, at least comprising: at least one electromagnetic wave detection section for detecting an electromagnetic wave radiated from the object and transmitted through the interface section;
10 and a position calculation section for calculating information on spatial position coordinates of the object based on a result of the detecting,

wherein the interface section has characteristics of transmitting the electromagnetic
15 wave radiated from the object, and at least the electromagnetic wave detection section and the position calculation section are provided in a space on the opposite side of the object with the interface section regarded as a boundary or enclosed inside the
20 interface section.

10. An information input apparatus, comprising:
the spatial position detection apparatus according to claim 9; and

an information input/output control section
25 that is provided in a space on the opposite side of the object with the interface section regarded as a boundary or enclosed inside the interface section,

monitors information on a relative distance between
an arbitrary position of the interface section and
the object, processes a result of the monitoring in
accordance with a predetermined interpretation method,
5 and controls an operation of the apparatus and input
states of information or a signal.